

Pre-Operational Testing Crosswalk

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Evaluate Information about the Pre-Operational Testing of the Proposed GS Site

40 CFR 146.82(c) and 40 CFR 146.87 or applicable state requirements; Implementation Manual Section 4.

This Crosswalk includes information from the Title 40 Code of Federal Regulations (CFR) and generally follows the layout of the Geologic Sequestration Data Tool (GSDT) and narrative templates, with additional information pulled from the Sequestration Guidance documents available on EPA's national UIC program website.

If you have uploaded a file to the GSDT the name will be captured in the system, as will all the filled-in or selected options. They can be downloaded by the permit reviewers as pdfs.

Narratives

Narratives cover the range of information desired and leave the final organization to the applicant's preference. The Crosswalk does not replace the Template but may add items to consider. Where there are similar questions repeated in different sections of the Template, the Crosswalk attempts to put those in a preliminary discussion at the front of the document in a generic format (i.e. each subsection will have a slightly different focus to reduce repetition).

Documents

To keep document size manageable and provide all the information in a usable format, it would be useful to create a separate file or files for the different types of information. If the GSDT upload option does not allow multiple files or overwrites the first one, zip the files together prior to uploading.

The Project Information Crosswalk discusses file format, styles, sizes, and types of supporting documentation requests under *Formatting and Other Data Expectations*.

Referencing Other Submissions

Note that a number of discussions are included under multiple headings and different modules. To avoid errors and duplication, please do NOT submit the detailed information twice. Include the appropriate synthesis in the section discusses and reference materials submitted as part of the permit application, via the AoR delineation modeling input advisor, etc., but references should be specific (e.g., "Computational modeling results - see permit application Section 1, pages 2 through 5 and Figures 1.7 through 1.12, as submitted 1/1/14."). Referenced materials should explicitly address the selected requirements. If using an uploaded file, include the file name as well.

Pre-Operational Testing

Pre-Operational Testing Plan (Narrative)

Table [SEQ Table * ARABIC]: Project Background Updates

Information	CFR and Guidance	Location & File: GSDT or CBI?
Project Background Updates	1.	
1. Update of proposed project information based on pre-operational testing and logging. (under each topic)	2.	
a. Compare original & update: discuss differences	1.	
b. Specific tests or results that led to updates (site-specific)	2.	
c. Logic or cause for change	3.	

Table [SEQ Table * ARABIC]: Project Information

Information	CFR and Guidance	Location & File: GSDT or CBI?
Project Information	40 CFR 146.82(a)(1) LAC §3607.B	
1. Project Timeframe		
2. Proposed mass/volume injection		
3. CO ₂ source		
4. CO ₂ composition		

Table [SEQ Table * ARABIC]: Final AoR Model and Delineation

Information	CFR and Guidance	Location & File: GSDT or CBI?
Final AoR Model and Delineation	40 CFR 146.82(c)(1) LAC §3619.A.1	
1. Summary of information and files submitted for final model and delineation.		
2. Additional information not submitted elsewhere.		
a. Necessary operational procedures		
b. APs added to the original list?		

Table [SEQ Table * ARABIC]: Associated documents

Information	CFR and Guidance	Location & File: GSDT or CBI?
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Associated documents		
1. Updated figures, tables and shapefiles		
a. Maximum vertical extent plume & pressure front		
b. Maximum lateral extent plume & pressure front		
c. AoR delineation map with proposed injection well(s) and monitoring wells		

Table [SEQ Table * ARABIC]: Site Characterization Updates

Information	CFR and Guidance	Location & File: GSDT or CBI?
Site Characterization Updates: Regional Geology, Hydrogeology and Local Structural Geology Maps and Cross Sections of the AoR Faults and Fractures Injection and Confining Zone Details Geomechanical and Petrophysical Information Seismic History Hydrologic and Hydrogeologic Information Geochemistry Other Information (Including Surface Air and/or Soil Gas Data, if Applicable) Site Suitability	40 CFR 146.82(c)(2) match Narrative submission; LAC §3619.A.1 40 CFR 146.82(a)(3)(vi); LAC §3607.C.1.b.i through 3607.C.1.b.ii LAC §3607.C.1.a.i through 3607.C.1.v; 3607.C.1.b.iii 40 CFR 146.82(a)(2), 146.82(a)(3)(i) 40 CFR 146.82(a)(3)(ii); LAC §3607.C.2.a 40 CFR 146.82(a)(3)(iii); LAC §3607.C.2.b 40 CFR 146.82(a)(3)(iv); LAC §3607.C.2.c 40 CFR 146.82(a)(3)(v); LAC §§3607.C.1.b.i, 3607.C.1.b.ii and 3607.C.1.b.iv 40 CFR 146.82(a)(3)(vi), 146.82(a)(5); LAC §3607.C.2.e 40 CFR 146.82(a)(6); LAC §3615	

	40 CFR 146.83	
1. Narrative description of updates to geologic structure and hydrologic properties. (align with narrative submitted under Project Information.)		
a. Compare to literature and regional data.		
b. Improved comprehensive understanding of site-specific conditions.		
c. Additional tests and monitoring needed?		

Table [SEQ Table * ARABIC]: Compatibility of the CO2 Stream

Information	CFR and Guidance	Location & File: GSDT or CBI?
Compatibility of the CO2 Stream	40 CFR 146.82(c)(3); LAC §3619.A.3 through 3619.A.3.c Section 3.3. of the EPA's UIC Program Class VI Site Characterization Guidance	
1. Narrative on compatibility between stream, injection zone fluids, minerals in both the confining and injection zones, and well construction materials.		
a. Limitations in the data.		
b. Major uncertainties remaining.		
c. What models or experiments were run with details (per original)		
d. Additional site-specific literature used in re-evaluation.		
e. Potential for reactions to cause dissolution or precipitation? Effects on permeability, porosity or injectivity; how modeled		
f. Mobilization of trace elements from formation minerals? (lead or arsenic or ...)		

Information	CFR and Guidance	Location & File: GSDT or CBI?
g. Injectate interaction with cement and loss of mechanical integrity?		
h. Formation testing that prompted changes in proposed CO ₂ stream or the Testing and Monitoring Plan.		

Table [SEQ Table * ARABIC]: Pre-Operational

Information	CFR and Guidance	Location & File: GSDT or CBI?
Logging and Testing	40 CFR 146.82(c)(4),(7) and 146.87: LAC §3619.A.4, 3619.A.7, and 3619.B	
1. Narrative of results from required 40 CFR 146.82(a)(8) procedures.		
a. Synthesize all the above, referencing applicable 40 CFR 146.82(a)(8) requirements.		
b. (results are submitted in the Pre-Op testing module.)		
c. Suitability of injection and confining zones.		
2. Description of all uploaded files for 40 CFR 146.87.		

Table [SEQ Table * ARABIC]: Transition from different class well to Class VI

Information	CFR and Guidance	Location & File: GSDT or CBI?
Transition from different class well to Class VI		
1. Previously collected testing, monitoring and logging data.		

Table [SEQ Table * ARABIC]: Pre-Operational Logging and Testing

Information	CFR and Guidance	Location & File: GSDT or CBI?
Well Logging Core Analyses Characterization of Injection Formation Fluid Properties Fracture Pressure of the Injection and Confining Zones Hydrogeologic Testing: Pressure Fall-Off Tests Injectivity and Pump Tests	40 CFR 146.82(c)(4),(7) and 146.87: LAC §3619.A.4, 3619.A.7, and 3619.B 40 CFR 146.87(a)(2) and (3); LAC §3617.B.1.b and 3617.B.1.c §§3617.B.2 and 3617.B.3 40 CFR 146.87(b) 40 CFR 146.87(b) and (c); LAC §3617.B.4.a 40 CFR 146.87(d)(1): LAC §3617.B.5.a through 3617.B.5.c 40 CFR 146.87(c)(1)-(3)	
1. Narrative of formation testing program required by 40 CFR 146.82(a)(8).		
a. Synthesize comprehensive understanding of site-specific geology and hydrology, and reference Class VI rule requirements at 40 CFR 146.82(a)(8) as applicable.		
b. (Results submitted directly to the GSDT's Pre-Operational Testing module.)		
c. Description of the files uploaded for 40 CFR 146.87.		
d. Match original filing requirements/ recommendations		

Table [SEQ Table * ARABIC]: Final Injection Well

Information	CFR and Guidance	Location & File: GSDT or CBI?
Construction Procedures:	40 CFR 146.82(c)(5); LAC §3619.A.5	
1. Describe final injection well construction procedures per 40 CFR 146.82(c)(5), with specific details for site-specific conditions		

Information	CFR and Guidance	Location & File: GSDT or CBI?
Casing and Cementing		
1. include or attach any other information necessary to demonstrate/establish compliance with the requirements at 40 CFR 146.86.		
2. Discuss changes or why none to previously submitted schematics and construction details		
a. Casing detail table		
b. Tubing & packer table		
3. include or attach any other information necessary to demonstrate/establish compliance with the requirements at 40 CFR 146.86.		

Table [SEQ Table * ARABIC]: Corrective Action

Information	CFR and Guidance	Location & File: GSDT or CBI?
Corrective Action Status	40 CFR 146.82(c)(6); LAC §3619.A.6	
1. status of corrective action for wells within the final AoR, to meet the requirements of 40 CFR 146.82(c)(6).		
a. number, type, and location of all plugs used to perform corrective action.		
b. Remedial cementing		
c. Progress on phased plan.		
d. (Upload) Relevant documentation; well plugging.		

Table [SEQ Table * ARABIC]: Mechanical Integrity (MIT)

Information	CFR and Guidance	Location & File: GSDT or CBI?
Plan Updates	40 CFR 146.82(c)(8) and 146.89: LAC §3619.A.8 and §3627 40 CFR 146.82(c)(9); LAC §3619.A.9	
1. Results of MIT per 40 CFR 146.82(c)(8).		
2. Support 40 CFR 146.89.		
a. Which approved methods used.		
b. Evidence of leaks or fluid movement in the wellbore.		
c. Results cause changes in the testing and monitoring plan?		
3. Upload revised plans		

Table [SEQ Table * ARABIC]: Well Operation

Information	CFR and Guidance	Location & File: GSDT or CBI?
Proposed operational procedures (table) Other Information	40 CFR 146.88; LAC §3621 40 CFR 146.82(a)(7) and (10); LAC §3607.C.2.f and 3607.C.2.i 40 CFR 146.82(c)(10); LAC §3619.A.10	
1. Describe updates to well operational procedures and/or proposed carbon dioxide stream, if applicable,		
2. If no updates are required, it will be assumed that the operational information provided in the 40 CFR 146.82(a) narrative still applies.		
3. Changes to well operational procedures or the carbon dioxide stream should be reflected in the final AoR model and delineation described earlier in this narrative.		
4. Update tables and/or figures per 40 CFR 146.82(a)(7) and (10).		

5. Also include or attach any other information necessary to demonstrate/establish compliance with 40 CFR 146.88.		
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Table [SEQ Table * ARABIC]: Well and Cement Logs

Information	CFR and Guidance	Location & File: GSDT or CBI?
Details		
1. Number of wells tested (for each well)		
Location		
1. Latitude		
2. Longitude		
3. Well Name		
During Drilling		
1. Deviation Checks		
2. Other: explain		
Pre-Surface Casing Logs (basic list)		
1. Resistivity		
2. SP		
3. Caliper		
4. Other: explain		
Post-any Casing Logs		
1. Cement Bond		
2. Variable Density		
3. Other: explain		
Pre-Long String Casing Logs (+basic list)		
1. Gamma Ray		
2. Fracture Finder		
Reports		
1. Number of reports (Uploaded)		
2. Description of file (for each)		
Notes		
1. Additional notes		

Table [SEQ Table * ARABIC]: MITs

Information	CFR and Guidance	Location & File: GSDT or CBI?
Details		
1. Number of wells tested (for each well)		

Location		
1. Latitude		
2. Longitude		
3. Well Name		
Tests for Internal & External Mechanical Integrity		
1. Pressure test (liquid or gas)		
2. Tracer Survey: specific name		
3. Temperature Log		
4. Noise Log		
5. Casing Inspection Lot		
6. Other (approved)		
Reports		
1. Number of reports (Uploaded)		
2. Description of file (for each)		
Notes		
1. Additional notes		

Table [SEQ Table * ARABIC]: Core Analysis

Information	CFR and Guidance	Location & File: GSDT or CBI?
Details		
1. Number of cores drilled/tested (for each core)		
2. Whole or Sidewall; ID		
Core Location		
1. Latitude		
2. Longitude		
3. Well Name		
4. Elevations:		
a. (uploaded)		
b. Entered: top & bottom vu; depth reference		
Formations cored		
1. List or file		
Properties or Tests Reported		
1. Total Porosity		
2. Diffuse Porosity		
3. Horizontal Permeability		
4. Vertical Permeability		
5. Fluid Saturation		

Information	CFR and Guidance	Location & File: GSDT or CBI?
6. Resistivity		
7. Residual Aqueous Saturation		
8. Residual Gas Saturation		
9. Relative Gas Permeability		
10. Relative Aqueous Permeability		
11. Bulk Compressibility		
12. Pore Compressibility		
13. Lithology		
14. Rock/Soil Types		
15. Rock Strength		
16. Ductility		
17. Elastic Properties (Young's Modulus, Poisson's Ratio)		
18. Other: specify		
Reports		
1. Number of reports (Uploaded)		
2. Description of file (for each)		
Supporting Data		
1. (Upload)		
Notes		
1. Additional notes		

Table [SEQ Table * ARABIC]: Formation Characterization (within the Injection Zone)

Information	CFR and Guidance	Location & File: GSDT or CBI?
Injection Zone Details		
1. Number of Formations (or distinct units/zones) (for each)		
Formation/Zone Properties		
1. Formation/Zone Name		
2. Fluid Temperature		
3. pH		
4. Conductivity		
5. Reservoir Pressure		
6. Static Fluid Level		
7. List other Physical/Chemical Parameters of the Formation		

Information	CFR and Guidance	Location & File: GSDT or CBI?
8. List other Physical/Chemical Parameters of the Formation Fluids		
Confining Zone Details		
1. Number of Formations (or distinct units/zones) (for each)		
Formation/Zone Properties		
1. Formation/Zone Name		
2. Fracture pressure		
3. List other Physical/Chemical Parameters of the Formation		
4. List other Physical/Chemical Parameters of the Formation Fluids		
Reports		
1. Number of reports (Uploaded)		
2. Description of file (for each)		
Supporting Data		
1. (Upload)		
Notes		
1. Additional notes		

Table [SEQ Table * ARABIC]: Injection Well Testing (prior to operation)

Information	CFR and Guidance	Location & File: GSDT or CBI?
Testing Details		
1. Number of Wells tested (for each)		
Well Location		
1. Latitude		
2. Longitude		
3. Well Name		
Tests Conducted		
1. Pressure Fall-Off Test		
2. Pump Test		
3. Injectivity Test		
4. Other: specify		
Reports		
1. Number of reports (Uploaded)		
2. Description of file (for each)		
Supporting Data		
1. (Upload)		

Information	CFR and Guidance	Location & File: GSDT or CBI?
Notes		
1. Additional notes		

Table [SEQ Table * ARABIC]: Complete Submission

Information	CFR and Guidance	Location & File: GSDT or CBI?
Validate Required Fields		
1. Required check for blank fields		
Authorized submission		
1. Must have completed an EPA Electronic Signature Agreement		
2. Submit means you agree to the certification.		